research management
findings
Number 4 • July 1987

STATUS AND CONTROL OF PURPLE LOOSESTRIFE IN WISCONSIN

by Richard Henderson

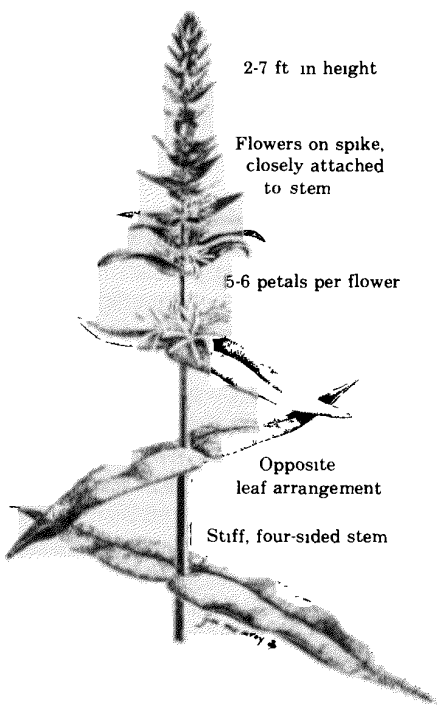
Purple loosestrife (Lythrum salicaria) was introduced to North America from Europe in the early 1800s. For about 100 years it struggled as a pioneering species on the northeastern seaboard and the St. Lawrence seaway. After this acclimation period, it began to dominate wetland habitats, degrading their productivity and diversity. Native plant communities, and the endangered species and wildlife they support, declined. Natural controls that evolved with loosestrife were left behind when it was introduced.

For the past 50-60 years this "purple tide" has been moving steadily westward. It was first detected in Wisconsin in the early 1930s. It remained uncommon and was considered harmless here for 40 years. Then about 1970 its invasive habits began to be expressed. This alarmed some people, but not everyone was convinced it was a problem worth addressing. Since then loosestrife numbers have been increasing rapidly, along with the concern of most natural resource managers.

Statewide Surveys

In 1984 a private citizens group, the Purple Loosestrife Task Force (PLTF), compiled information on loosestrife from herbarium records and observations turned in by volunteers searching from roadsides around the state. In 1985 and 86, the Department of Natural Resources (DNR) Bureau of Research expanded this data base by soliciting incidental observations from the general public and natural resource professionals through informational fliers and report cards distributed statewide. During the same time the Bureau of Research also organized a standardized block survey.

Information gathered in all surveys included (1) loosestrife location, (2) general habitat type, and (3)


2-7 ft in height
Flowers on spike, closely attached to stem
5-6 petals per flower
Opposite leaf arrangement
Stiff, four-sided stem

colony size. The DNR incidental cards provided 63% of the loosestrife locations. Although the standardized survey provided only 12% of total locations, its design allowed the status of loosestrife to be quantified and expanded to a statewide total.

All survey field work was done by volunteers. To test the reliability of observations, a random sample of 5% (114) of the observations was drawn and field checked. Accuracy was 94% for identification and location reporting, 92% for habitat type, and 70% for colony size (no. of plants/colony). Of the colony size reports that were off, 33% were too low and 66% were too high.

How Much and Where?

Purple loosestrife is clearly widely dispersed in Wisconsin. It was found in 70 of the state's 72 counties and 39% of the 1,668 townships (Fig. 1). However, densities are low over most of the state, and most colonies are small. Statewide, 70% of the colonies are less than an acre and have fewer than 100 plants; 44% have fewer than 20 plants. This distribution pattern is typical of a plant still in a pioneering stage of establishment.

In terms of numbers, 2,202 separate loosestrife colonies were reported. They represent approximately 450,000 plants covering 2,600 acres. Areas of heaviest infestation were (1) sections of the Wisconsin River, (2) much of the extreme southeast part of the state centered on Waukesha county, and (3) the Wolf and Fox River drainage systems.

Numbers reported by the surveys represent an estimated 8% of the total state population. This means there are roughly 25,000 colonies, of nearly 5 million plants, covering 30,000 acres in Wisconsin. Although these figures may seem overwhelming, this is just the beginning. Thirty thousand acres is only 3% of the wetland acreage susceptible to loosestrife.

Habitat Type

The block survey showed no correlation between the quantity of wetland acreage and the likelihood of finding loosestrife, or the quantity of wetland acreage and the quantity of loosestrife when found. Purple loosestrife was found in a variety of habitats, but it was most commonly found in wetlands and moist soil sites (Table 1). The upland sites were at least seasonally wet or were located in cool and moist (low evapotranspiration) climates, such as along Lake Superior.

Moist soil seems to be critical only during seed germination and seedling establishment. Mature plants can tolerate very dry conditions, thus loosestrife's ability to do well in gardens.

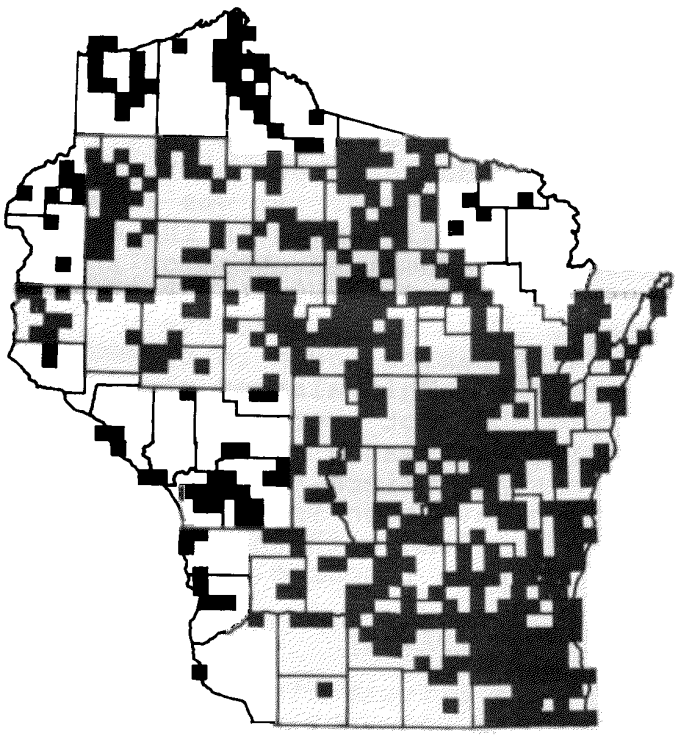


FIGURE 1. Distribution of purple loosestrife by township (1986, DNR block survey).

TABLE 1. Habitat occupied by purple loosestrife in Wisconsin (1986, all surveys combined)

Habitat Type	Reports No.	Reports %
Marsh	636	23
Stream/riverbank	578	21
Roadside	529	19
Pond/lakeshore	385	14
Ditch (nonroadside)	374	14
Lowland meadow/ pasture	108	4
Garden/lawn	70	3
Upland old field	27	1
Other	49	2

How Does It Spread?

Long distance dispersal of purple loosestrife into new watersheds and basins is brought about by both natural and human activity but human activity is probably the primary cause. Long distance dispersal occurs by seeds via horticultural plantings; transport on boats, trailers, boots, and other gear; and possibly transport on ducks.

Loosestrife spread within a watershed tends to be insidious. At first only one or two plants become established from the chance introduction of seed into the basin. These pioneers may go unnoticed for decades, producing 100,000s of small mobile seeds each year The seeds move about locally through water, wind, and animal movement, gradually building up a seed bank within the drainage basin and downstream. No (or very few) new plants show up until the right disturbance conditions come along. Then major population explosions may occur in 1-2 years. Thus, a problem may go undetected until much damage is done.

Purple loosestrife requires exposed, preferably moist, soil for optimum germination and seedling establishment. Soil disturbances such as ditch digging, mud flat exposure, and silt deposition greatly increase the chances of establishment, especially large population explosions.

How Do We Stop It?

Attempting to control purple loosestrife in areas of heavy infestation (where seed banks are dense and widespread) by mechanical or chemical means is often futile. Such efforts may even make the situation worse if competing vegetation is damaged or lost in the process. This generally happens with broadcast spraying of nonselective herbicides. The disturbance associated with this tends to accelerate loosestrife seedling establishment. The development of biological control agents appears to be the only practical hope for regions of heavy infestation, but this is 10-15 years off at best.

For now. prevention/containment appears to be the best way to control heavy infestations. Prevention is best accomplished by locating and removing, or killing with prudent use of herbicide, the first observed plants or colonies in a watershed or drainage basin.

Small (less than 50 plants) isolated colonies can be eradicated relatively easily Careful use of herbicides is the preferred means of removal. Frequent mowing or cutting may eliminate seed production, but unless it is done biweekly (or below the water level prior to freeze-up) it will not kill the plants. Also, cuttings left behind on wet sites may root themselves thereby spreading the plant. Pulling and digging are practical with small plants in loose soil, but this is very labor intensive with large plants. These methods also tend to create disturbed soil, which allows plants to reestablish from seed.

For small isolated colonies, nonselective glyphosate herbicides are very effective if applied in August or September in a 1.5% solution to individual plants. However, great care must be taken not to overspray and thus damage adjacent vegetation, which in turn would release the loosestrife seed bank. In fact, work done by Jim Reinartz at the U.W.-Milwaukee Field Station indicates it is best to spray no more than 25-50% of a plant's foliage. The safest method of applying glyphosate herbicide is to cut off all stems at about 6" and then paint or drip onto the cut surface a 20-30% solution.

Broadleaf herbicides (2,4,D based) can be effective on loosestrife if applied in late May or early June. They have the advantage of not harming monocot species, which are the dominants in most wetland types. The disadvantage of treating early in the season is that purple loosestrife plants are easily overlooked because they are not in flower.

It is critical that any control effort be followed up the same growing season and for several years afterwards to catch missed, resprouting, or newly established plants. In all herbicide use, follow label directions implicitly and adhere to state and local regulations.

The Upshot

Purple loosestrife is currently widespread in Wisconsin. But fortunately for us, the invasion is not out of control--yet. At this time about 3% of our wetlands can be considered beyond hope of control. Over the rest of the state the plant is still in a pioneering stage. If a coordinated control program is begun now, we have a reasonable chance of containing loosestrife with mechanical and chemical means until a long-term solution, such as a biological control, is developed.

Suggested Reading

Stuckey, R.L. 1980. Distributional history of Lythrum salicaria (purple loosestrife) in North America. Bartonia 47:3-20.

Richard Henderson is a wildlife research biologist for the Wisconsin Department of Natural Resources. He leads a study on the status, distribution, control, and ecology of purple loosestrife in Wisconsin. Address: DNR, 3911 Fish Hatchery Road, Fitchburg, WI 53711. Telephone: (608)275-3214.

Edited by Betty Les
Art work by Jim McEvoy

Bureau of Research
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707

BLKRT
US POSTAGE PAID MADISON, WI PERMIT 906